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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,244	03/25/2004	Pankaj Gupta	NLMI.P162	6712
30554	7590	10/16/2007	EXAMINER	
SHEMWELL MAHAMEDI LLP 4880 STEVENS CREEK BOULEVARD SUITE 201 SAN JOSE, CA 95129			LOVEL, KIMBERLY M	
		ART UNIT	PAPER NUMBER	
		2167		
		MAIL DATE	DELIVERY MODE	
		10/16/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/809,244	GUPTA ET AL.
	<b>Examiner</b>	<b>Art Unit</b>
	Kimberly Lovel	2167

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 31 July 2007.

2a) This action is **FINAL**.                    2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 8-16 and 19-24 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 8-16 and 19-24 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date 8/17/07.

4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_

5) Notice of Informal Patent Application  
 6) Other: \_\_\_\_\_

### **DETAILED ACTION**

1. This communication is in response to the Amendment filed 31 July 2007.
2. Claims 8-16 and 19-24 are currently pending. In the Amendment filed 31 July 2007, claims 9, 13, 21 and 24 are amended and claims 17 and 18 are canceled. This action is made Final.
3. The rejections of claims 8, 9-11 and 17-24 as being anticipated by US Patent No 6,018,524 to Turner et al and claims 12-16 as being unpatentable over US Patent No 6,018,524 to Turner et al and further in view of US Patent No 6,735,600 to Andreev et al have been maintained.

#### ***Information Disclosure Statement***

4. The information disclosure statement (IDS) submitted on 17 August 2007 was filed after the mailing date of the Office Action on 1 May 2007. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner.

#### ***Claim Objections***

5. The objections to **claims 9, 13, 18 and 24** are withdrawn as necessitated by amendment.

***Claim Rejections - 35 USC § 112***

6. The rejections of **claims 21 and 24** under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention are withdrawn as necessitated by amendment.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. **Claims 8, 9-11 and 19-24 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No 6,018,524 to Turner et al (hereafter Turner).**

Referring to claim 8, Turner discloses a method for updating a forwarding database, comprising:

forming a hierarchical tree structure of the forwarding database [forwarding table] by splitting N number of prefixes within the database into a number of sub-databases bounded by  $N/T$  and  $2N/T+1$ , wherein each sub-database has no more than T number of prefixes, with T being less than N (see column 2, lines 12-13; column 4, lines 50-56; Fig 6; and Fig 7);

modifying the hierarchical tree structure in accordance with one or more update operations [insertion strategy] (see column 14, lines 42-43 and Fig 19); and

updating a portion of the forwarding database to reflect modifications made to the hierarchical tree structure, wherein the updated portion corresponds to only those sub-databases affected by the update operations [incremental algorithm done by doing the Insert algorithm for an individual prefix when a new prefix is added] (see column 17, line 60 – column 18, line 34).

**Referring to claim 9,** Turner discloses the method of claim 8, wherein said forming comprises, beginning with a most significant bit of the N number of prefixes, repeatedly splitting the N number of prefixes into a plurality of nodes extending between and including a root node and a plurality of leaf nodes, and wherein each of the plurality of leaf nodes corresponds to one of the sub-databases (see column 5, lines 41-62 and Fig 7).

**Referring to claim 10,** Turner discloses the method of claim 9, wherein said modifying comprises performing the update operations on one or more of the plurality of leaf nodes, wherein the update operations are selected from a group comprising: adding [insertion] a new prefix to the forwarding database, deleting an existing prefix from the forwarding database and modifying an existing prefix in the forwarding database (see column 14, lines 42-43; column 17, line 60 – column 18, line 34 and Fig 19).

**Referring to claim 11,** Turner discloses the method of claim 10, wherein said modifying comprises no further steps [no further steps are mentioned] (see column 14, lines 42-43; column 17, line 60 – column 18, line 34 and Fig 19).

**Referring to claim 19,** Turner discloses a computer readable storage medium, comprising:

a forwarding database comprising N number of prefixes split among a plurality of sub-databases, wherein each sub-database initially includes less than T number of prefixes, with T being less than N (see column 2, lines 12-13; column 4, lines 50-56; Fig 6; and Fig 7); and

an updating program that, when executed upon a processor:

(1) modifies a hierarchical tree structure in accordance with one or more update operations [insertion strategy], wherein prior to execution of the updating program, the hierarchical tree structure included a number of branches extending from a root node to a plurality of leaf nodes, and wherein each of the plurality of leaf nodes corresponds to one of the plurality of sub-databases (see column 14, lines 42-43 and Fig 19); and

(2) updates a portion of the forwarding database to reflect modifications made to the hierarchical tree structure, wherein the updated portion corresponds to only those sub-databases affected by the update operations [incremental algorithm done by doing the Insert algorithm for an individual prefix when a new prefix is added] (see column 17, line 60 – column 18, line 34).

**Referring to claim 20,** Turner discloses the computer readable storage medium of claim 19, wherein the computer readable storage medium is directly coupled to, or incorporated within, the processor, and wherein at least a portion of the sub-database at each leaf nodes is contained within respective portions of the computer readable storage medium (see column 15, lines 60-62; column 16, lines 1-10 and Fig 14).

**Referring to claim 21,** Turner discloses the computer readable storage medium of claim 20, wherein the computer readable storage medium comprises random access memory (see column 15, lines 60-62; column 16, lines 1-10 and Fig 14).

**Referring to claim 22,** Turner discloses the computer readable storage medium of claim 20, wherein the updating program is stored within the computer readable storage medium, along with the forwarding database, or within a memory structure indirectly coupled to the processor (see column 15, lines 60-62; column 16, lines 1-10 and Fig 14).

**Referring to claim 23,** Turner discloses the computer readable storage medium of claim 22, wherein a copy of the forwarding database is stored within the memory structure (see column 7, line 44).

**Referring to claim 24,** Turner discloses the computer readable storage medium of claim 20, wherein, the memory structure comprises one or more of a random access memory, a content-addressable memory, or a network search engine (NSE) (see column 5, lines 18-31).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

**8. Claims 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No 6,018,524 to Turner et al as applied to claim 10 above, and further in view of US Patent No 6,735,600 to Andreev et al (hereafter Andreev).**

Referring to claim 12, Turner discloses modifying the tree structure, however, Turner fails to explicitly disclose the further limitations of splitting a leaf node or merging a leaf node. Andreev discloses modifying a tree structure by inserting and deleting entries (see abstract and column 3, lines 43-52), including the further limitation wherein said modifying further comprises one or more of the following steps:

splitting a leaf node, which has been modified to include more than T number of prefixes, into at least one additional pair of leaf nodes, each having less than T number of prefixes (see column 3, lines 52-58); and

merging a leaf node, which has been modified or split to include fewer than a minimum number of prefixes, with a parent node arranged closer to the root node than the leaf node having fewer than the minimum number of prefixes (see column 3, lines 59-65) in order to decrease the time it takes to update a tree during insertion or deletion.

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the steps of splitting and merging the nodes of the tree structure as disclosed by Andreev to modify the tree structure if Turner. One would have been motivated to do so in order to decrease the time it takes to update a tree during insertion or deletion since lookup procedures are a major source of bottlenecks in high-performance routers (see Andreev: column 1, lines 25-30).

**Referring to claim 13,** the combination of Turner and Andreev (hereafter Turner/Andreev) discloses the method of claim 12, wherein said merging is performed only if:

the total number of nodes in the hierarchical tree structure is equal to or greater than  $2N/T+1$ ; or

the total number of nodes in the hierarchical tree structure falls within a predetermined range of values immediately preceding or encompassing the value represented by  $2N/T+1$ ; or

a predetermined time period has passed, in which no merging was performed (see column 3, lines 54-58; column 4, lines 37-52; and column 7, line 28 – column 8, line 7).

**Referring to claim 14,** Turner/Andreev discloses the method of claim 13, wherein said merging further comprises repeatedly merging the leaf node and the parent node up towards the root node, if the number of prefixes within the leaf node, the parent node and any subsequently merged parent nodes remains less than the minimum number of prefixes (see column 7, lines 28 – column 8, line 7).

**Referring to claim 15,** Turner/Andreev discloses the method of claim 12, wherein said merging is performed only if no other node exists below the parent node that can be paired with the leaf node, such that the combined number of prefixes within the leaf node and the other node is greater than T (see column 3, lines 54-58; column 4, lines 37-52; and column 7, line 28 – column 8, line 7).

**Referring to claim 16,** Turner/Andreev discloses the method of claim 15, wherein, said merging is performed no more than one time (see column 3, lines 54-58; column 4, lines 37-52; and column 7, line 28 – column 8, line 7).

***Response to Arguments***

9. Applicant's arguments filed in regards to the prior art rejections have been fully considered but they are not persuasive.

Referring to applicants' arguments on pages 6-7 of the Remarks regarding claim 1, the applicants state: Turner fails to disclose or suggest the above recited limitation of Claim 8. Turner discloses an algorithm for building a database of tables whenever a new prefix is added or deleted (Turner, col. 17, lines 60-64). However, in contrast to Applicant's Claim 8, Turner discloses that the algorithm "processes the whole database whenever a new prefix is added or deleted" (Turner, col. 18, lines 24-25).

The examiner agrees that Turner states that "the algorithm just described processes the whole database whenever a new prefix is added or deleted." However, as stated in the rejection, Turner goes on to state that "A more incremental algorithm can be done by doing the Insert algorithm for an individual prefix when a new prefix is added. However, adding the new prefix changes the bmp values of all markers in the subtrie rooted at the new prefix (Turner, col. 17, lines 25-29)." The incremental update inserts the individual prefix. After the new prefix is inserted, the bmp values of all markers in the subtrie rooted at the new prefix change. Therefore, the step of updating the values is considered to represent updating a portion since only the bmp values

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located below the new prefix change. Also, the subtrie of Turner is considered to represent the claimed sub-database.

10. Since claims 9-11 depend from claim 8 and therefore fail to distinguish over the cited reference for at least the same reason as Claim 8.

11. As discussed above with respect to claim 8, Turner discloses an updating program that "updates a portion of the forwarding database ... wherein the updated portion corresponds to only those sub-databases affected by the update operations."

Accordingly, Claim 19 is anticipated by Turner.

12. Since claims 20-24 depend from claim 19 and therefore fail to distinguish over the cited reference for at least the same reason as Claim 19.

13. Since claims 12-16 depend from claim 8 and therefore fail to distinguish over the cited reference for at least the same reason as Claim 8.

***Conclusion***

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimberly Lovel whose telephone number is (571) 272-2750. The examiner can normally be reached on 8:00 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Cottingham can be reached on (571) 272-7079. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kimberly Lovel  
Examiner  
Art Unit 2167

12 October 2007  
kml



JOHN COTTINGHAM  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100